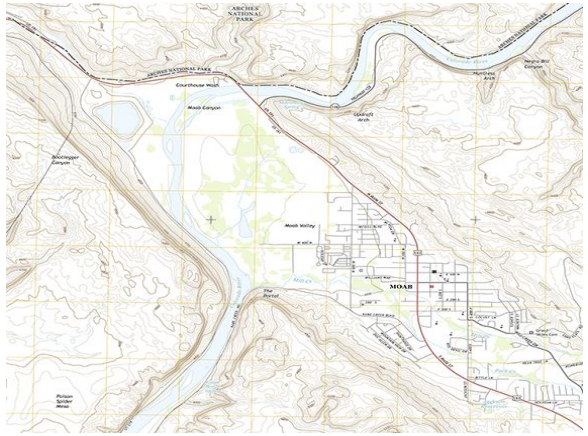
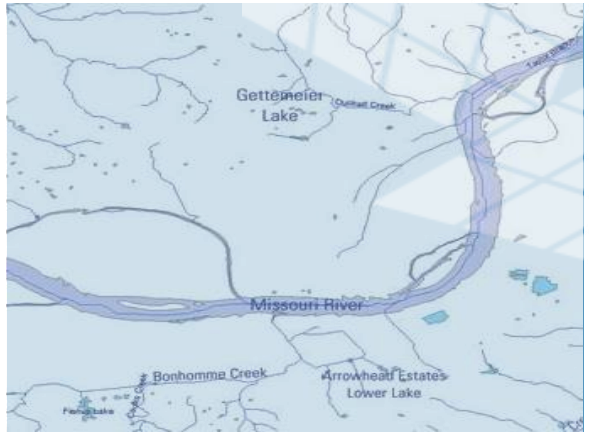
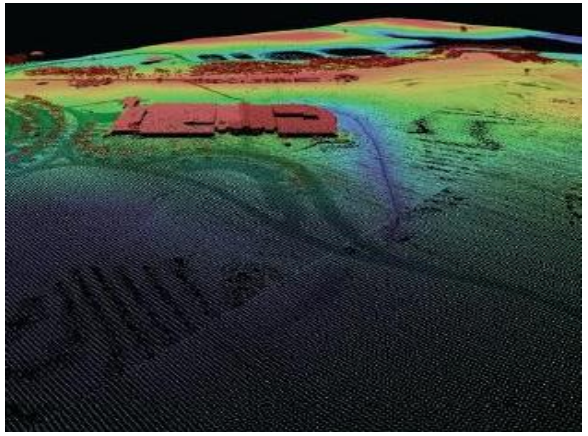
3D Elevation Program Introduction, Update, and Future Direction for NGAC







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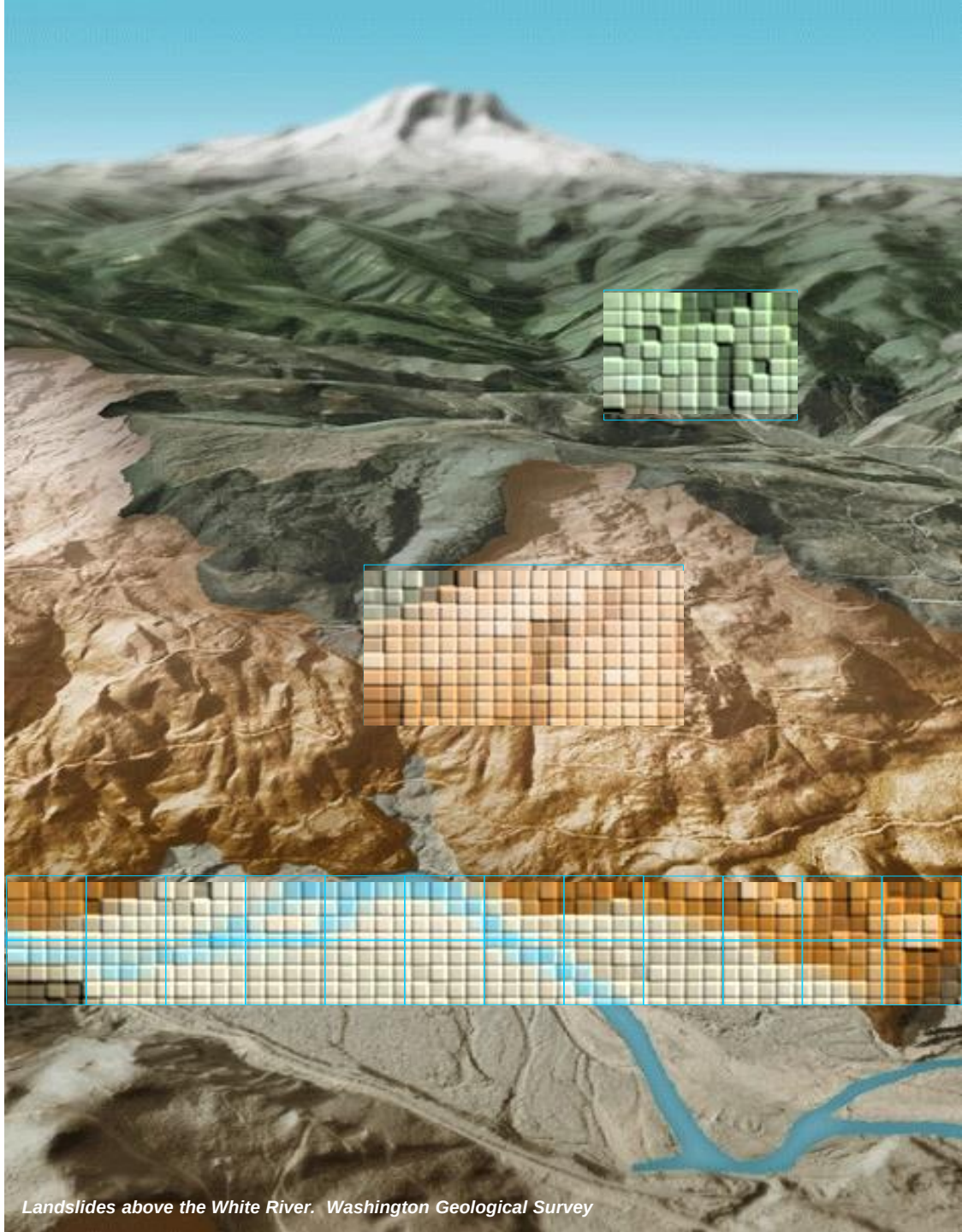
Mike Tischler, Ph.D.
Director, National Geospatial Program
May 18, 2022

NGP Mission

Provide national topographic information to advance science, support government, enlighten citizens, and enable decision making

- **F**indable
- **A**ccessible
- **I**nteroperable
- **R**eusable
- **+**consistent, high-quality



Landslides above the White River. Washington Geological Survey

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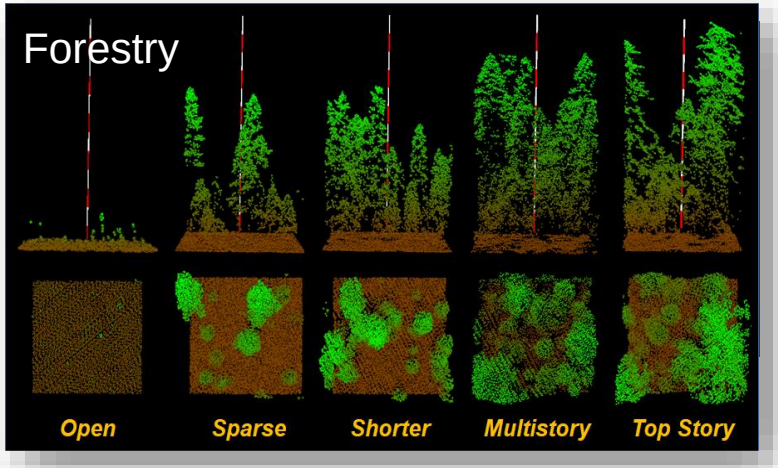
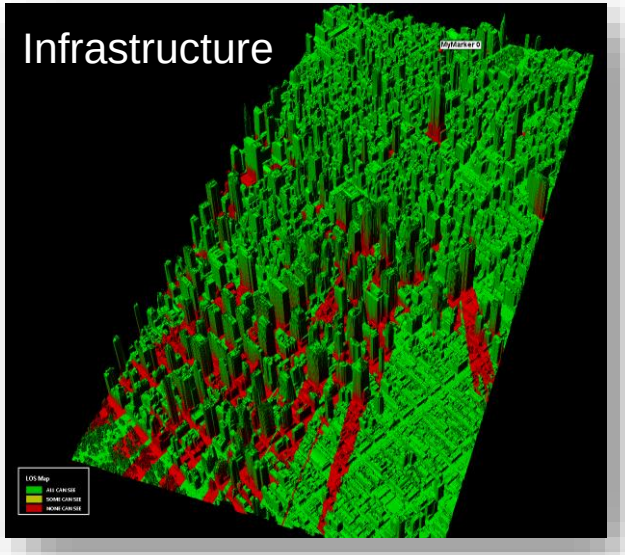
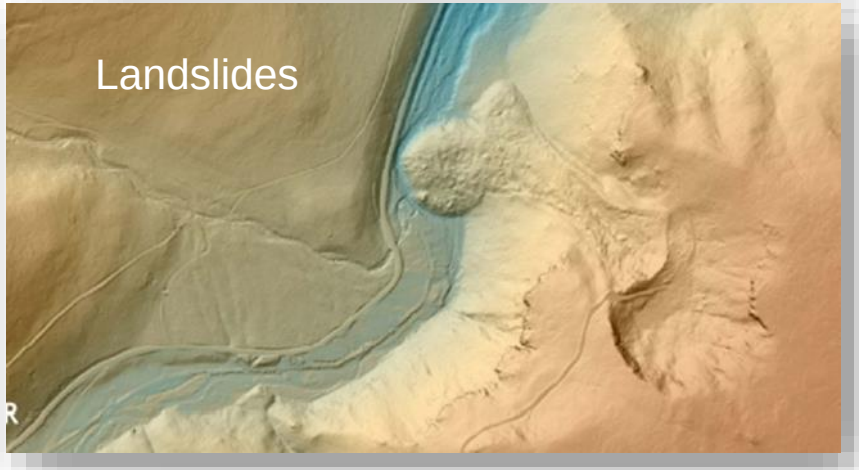
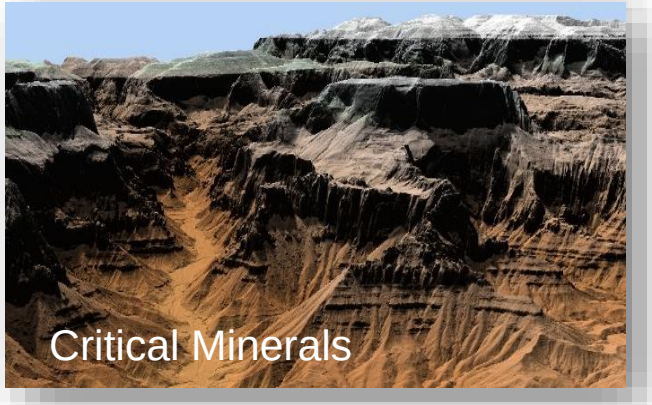
3D Elevation Program (3DEP) Goal

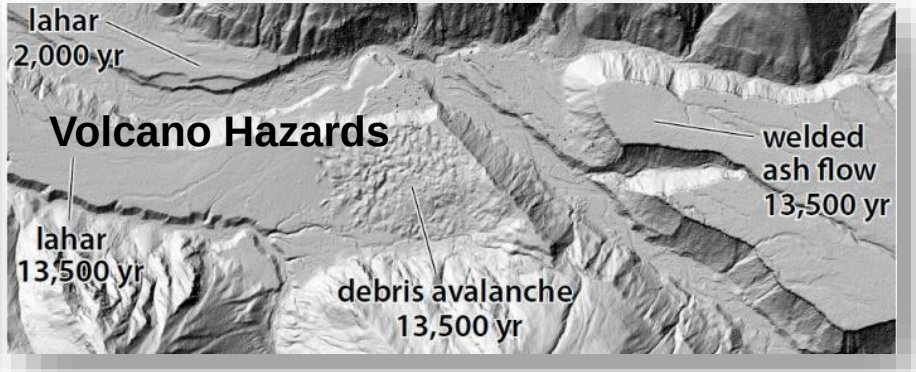
Complete acquisition of nationwide lidar (IfSAR in AK) to provide the **first-ever national baseline of consistent high-resolution elevation data collected in a timeframe of less than a decade**





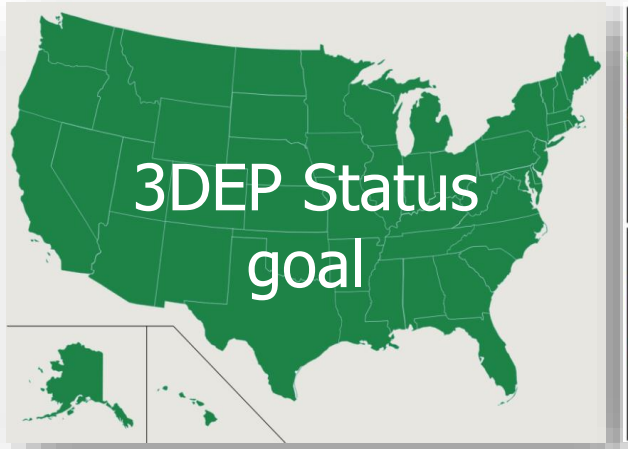


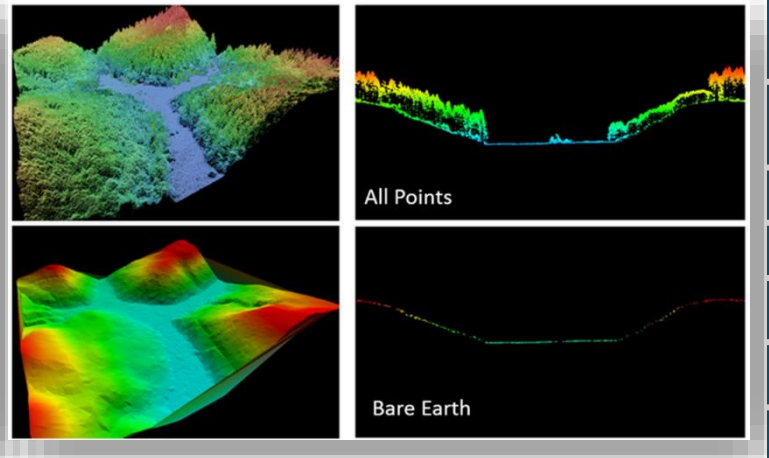




3D Elevation Program (3DEP) Goal

- Complete acquisition of nationwide lidar (IfSAR in AK to provide the **first-ever national baseline of consistent high-resolution elevation data – both bare earth and 3D point clouds**
- Address Federal, state and other mission-critical requirements
- Realize ROI 5:1 and potential to generate $13 billion/year
- Leverage the expertise and capacity of private mapping firms
- Achieve a 25% cost efficiency gain
- Completely refresh national data holdings





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		Annual Benefits	
Rank	Business Use	Conservative	Potential
1	Flood Risk Management	$295M	$502M
2	Infrastructure and Construction Management	$206M	$942M
3	Natural Resources Conservation	$159M	$335M
4	Agriculture and Precision Farming	$122M	$2,011M
5	Water Supply and Quality	$85M	$156M
6	Wildfire Management, Planning and Response	$76M	$159M
7	Geologic Resource Assessment and Hazard Mitigation	$52M	$1,067M
8	Forest Resources Management	$44M	$62M
9	River and Stream Resource Management	$38M	$87M
10	Aviation Navigation and Safety	$35M	$56M
:			
20	Land Navigation and Safety	$0.2M	$7,125M
	Total for all Business Uses (1 – 27)	**$1.2B**	**$13B**

Building National 3DEP Coverage One Year at a Time

$13B

Potential annual benefit with ROI of 5:1

> 300

Partner Organizations

65

Percent of total 3DEP cost contributed by partners

52 Trillion

Lidar data points being distributed

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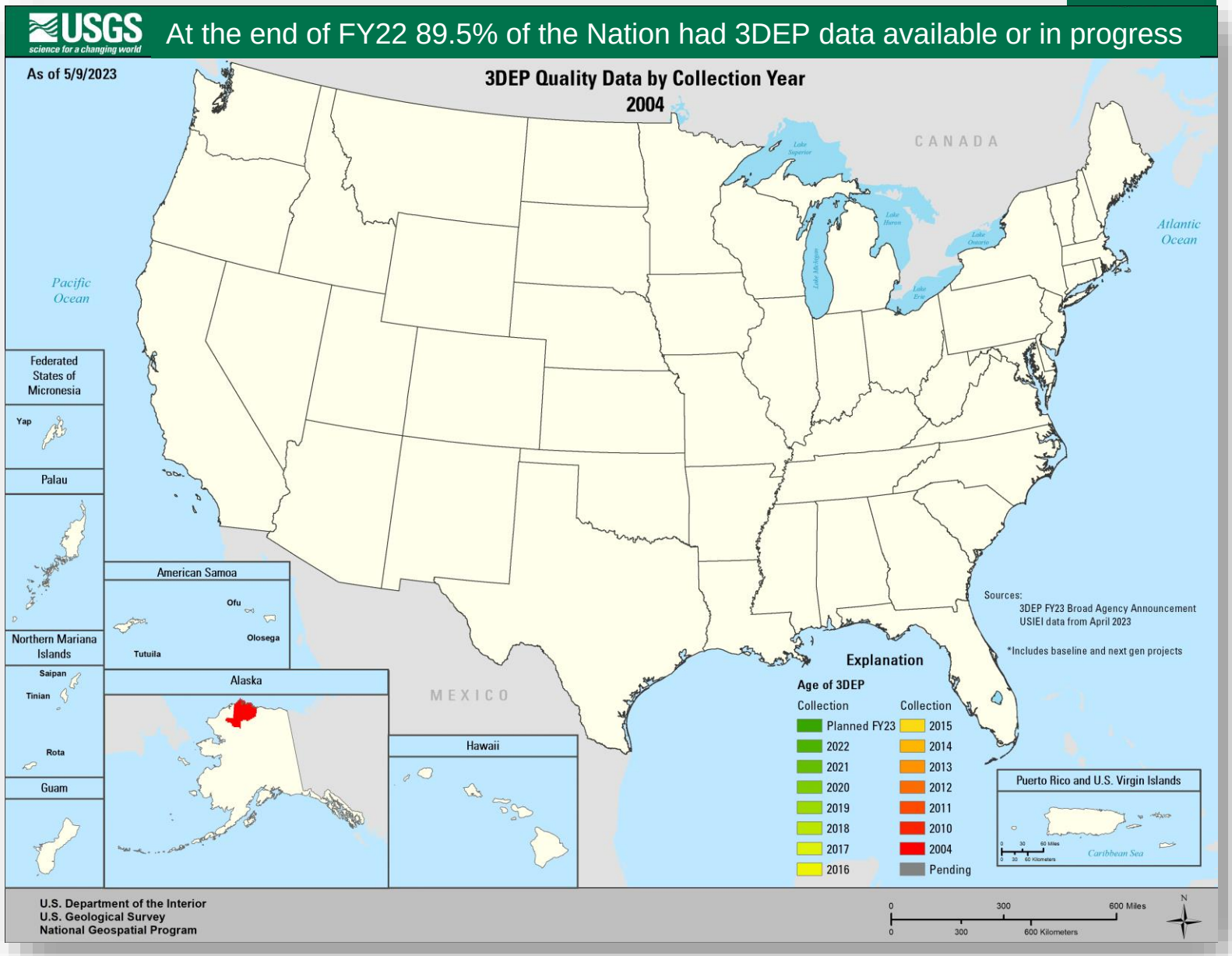
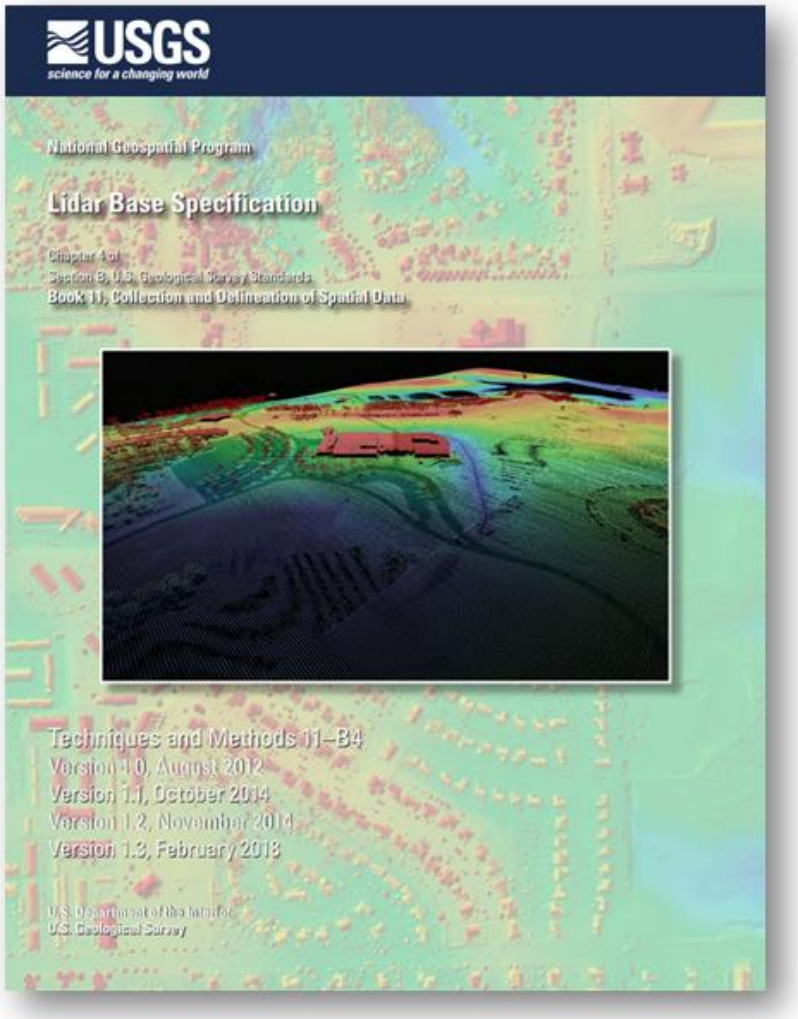


3DEP Operational Infrastructure

Supporting Partner Needs

- **Broad Agency Announcement** - Fair and equitable process for non-Feds to partner with Federal Agencies, announced on sam.gov and grants.gov
- **Geospatial Products and Services Contracts (GPSC)**
  - Preferred method for acquiring 3DEP data because it ensures quality and consistency of data
  - Value added service – GPSC staff coordinate partnership funding; handle contracting; provide project planning, tracking, and management; and provide quality review and delivery
- **US Interagency Elevation Inventory** – Co-managed with NOAA to ensure all publicly available lidar is discoverable and to avoid duplication
- **USGS Lidar Base Specification** – Ensures consistent data across multiple sources
- **The National Map** - Data delivered free to the public via The National Map website
- **Lidar Explorer Application** – Process lidar data within the cloud



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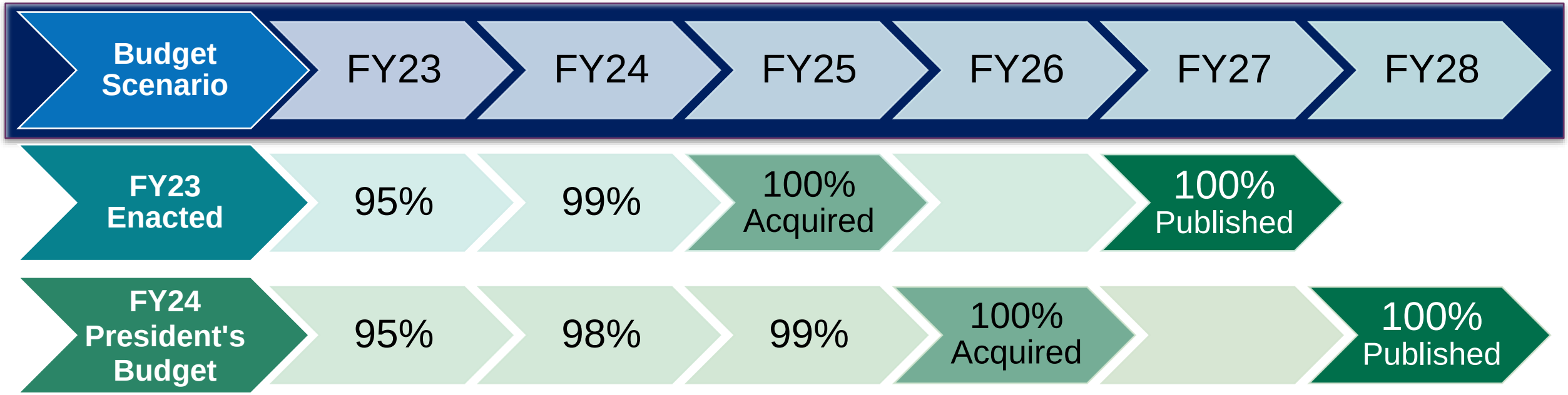
Current projections for 3DEP baseline completion

Contingent on budget and partnerships



3D National Topography Model (3DNTM)

Topography is defined by elevation and hydrography; elevation shapes hydrography, and hydrography shapes elevation. To support a broad range of applications, the **3D National Topography Model** integrates U.S. Geological Survey (USGS) elevation and hydrography datasets to model the Nation's topography in 3D.

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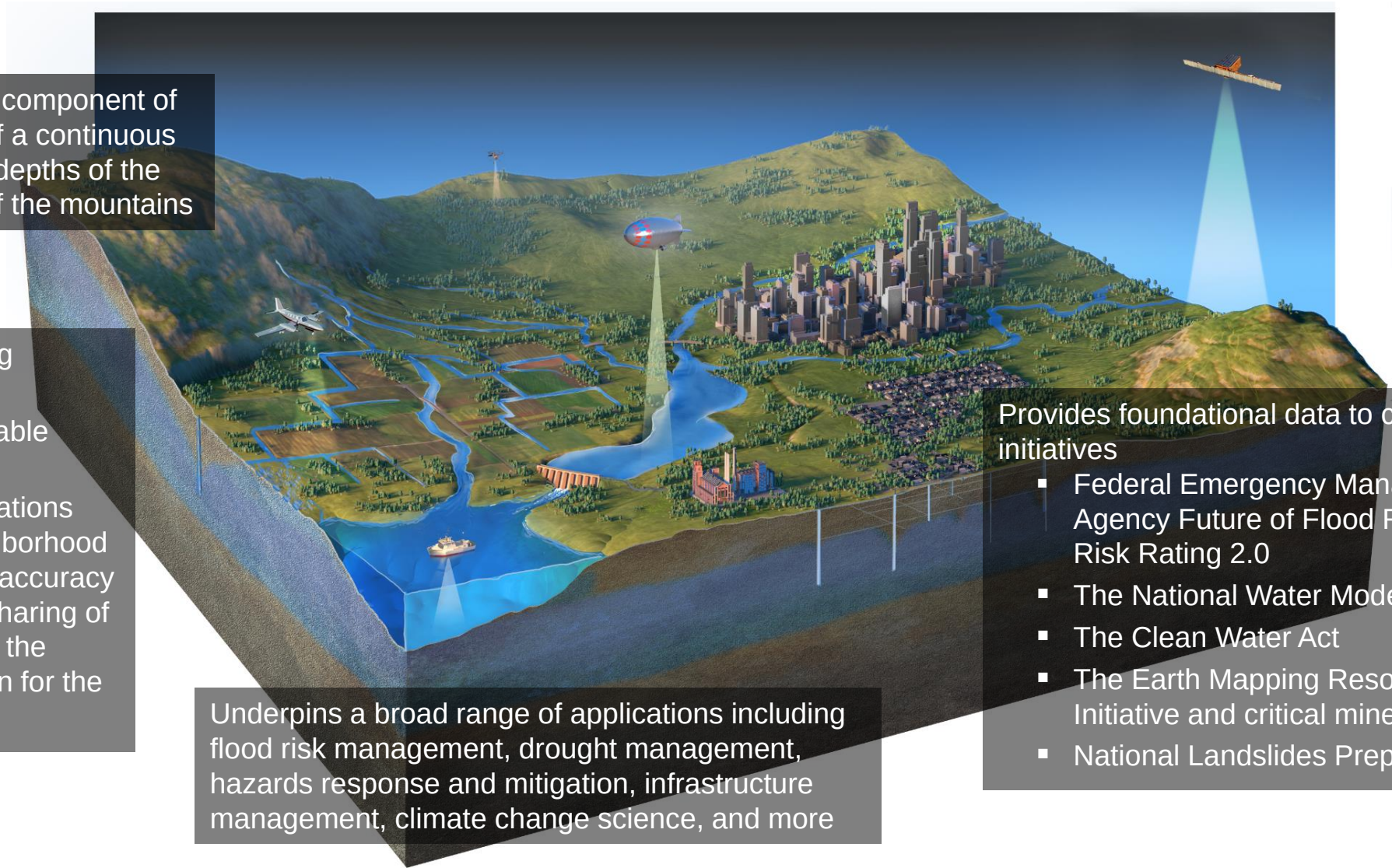
Delivers the terrestrial component of the 3D Nation vision of a continuous data surface from the depths of the oceans to the peaks of the mountains



Enables new and emerging applications

- Multiple vintages enable change detection
- Water-related applications move from the neighborhood to the street-level in accuracy
- Provides universal sharing of water information as the geospatial foundation for the Internet of Water

Provides foundational data to critical initiatives

- Federal Emergency Management Agency Future of Flood Risk Data and Risk Rating 2.0
- The National Water Model
- The Clean Water Act
- The Earth Mapping Resources Initiative and critical minerals
- National Landslides Preparedness Act

Underpins a broad range of applications including flood risk management, drought management, hazards response and mitigation, infrastructure management, climate change science, and more

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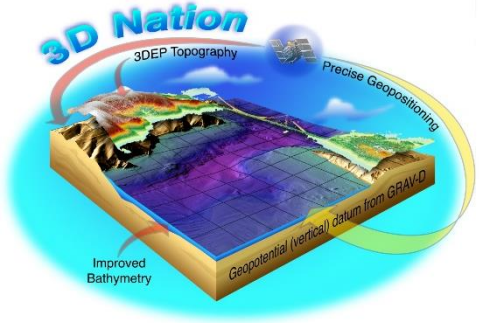
3D National Topography Model (3DNTM)

Integrates elevation and hydrography datasets to model the Nation's topography in 3D



3D Hydrography Program (3DHP)

- Hydrography derived from/integrated with 3D Elevation Program data
- Connections to groundwater, wetlands, and engineered hydrography
- 3DHP Infostructure for data sharing as part of the Internet of Water

Next Gen 3D Elevation Program (3DEP)

- New quality levels and refresh cycles
- Integration of inland bathymetry
- 3DEP Ecosystem for data and resource sharing
- Continual improvement with new technologies and approaches

Future Integrated 3D Model

- *Research and develop a 3D data model to fully integrate 3DHP and next gen 3DEP*
- *Integrate other data from The National Map*

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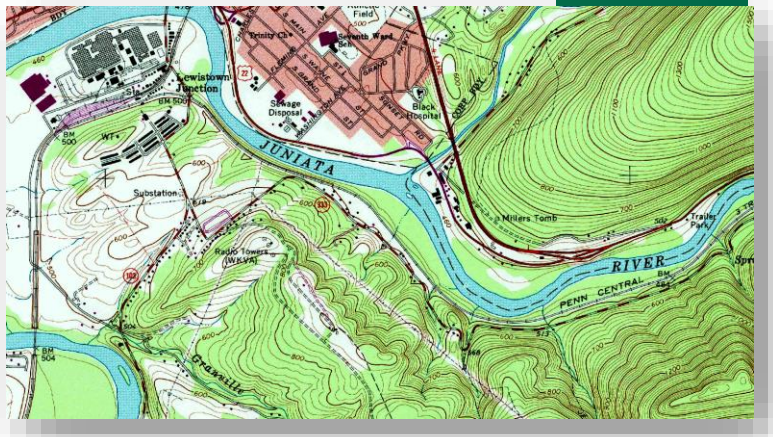
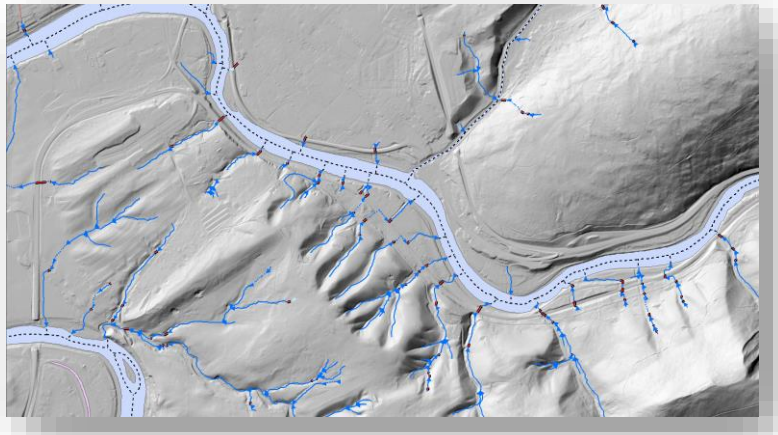
3DHP FY23 Development

Status Update

- Completely redesigned and streamlined data model based on Open Geospatial Consortium (OGC) conceptual model
  - Integrates key features of NHD, WBD, and NHDPlus
  - Reduces the number of unique feature types by 90% while retaining 95% of the hydrologic feature content
- Developed and implemented first systematic inspection processes for hydrography data based on published specifications
- Plan to release first version of the 3DHP dataset based on NHD data as a web feature service by the end of FY23 – fill in with new data as funding and partnerships grow
- New funding for 3DNTM that is being used for 3DHP
  - $500K in FY23
  - $1.5 M in FY24 President's budget

1966





2022

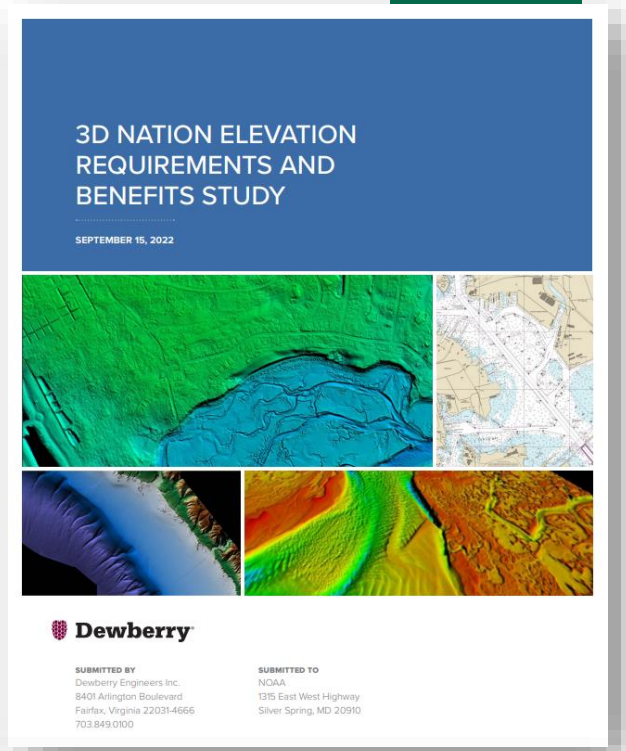
Next Generation of 3DEP

3D Nation Elevation Requirements and Benefits Study

- The first generation of 3DEP provides an essential national baseline of consistent, high-quality data that will continue to grow in value as it is used for comparison with new data collected over time

- With 3DEP data available or in progress for more than 89.5% of the Nation, USGS is drawing on the results of the 3D Nation Study to design the next generation program to provide increased quality levels (QLs) and refresh rates with more flexibility to meet changing user needs

- 3D Nation Study was commissioned by NOAA and USGS to understand inland, nearshore, and offshore elevation data requirements and benefits
  - $13.5 billion annual benefits documented
  - 1,352 mission critical requirements
  - 45 Federal agencies; 56 state, 99 local, 8 Tribal governments; 34 private companies; 24 others



	3DEP Baseline	Next Gen 3DEP
Target Quality Level For what QL of data will the USGS generally provide partner funding?	QL2 / QL5 in AK	Higher quality
Scope Where do we collect data?	Topographic data	Topographic and bathymetric data
Update frequency On what vintage of data does USGS partner to update coverage?	8 years	Increased frequency

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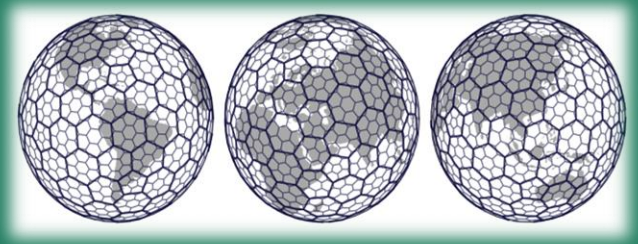
Next Gen 3DEP Research Plan

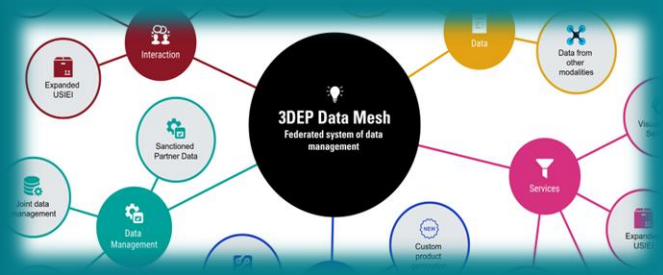
Meeting evolving needs

Evolve and advance program design, products, and services



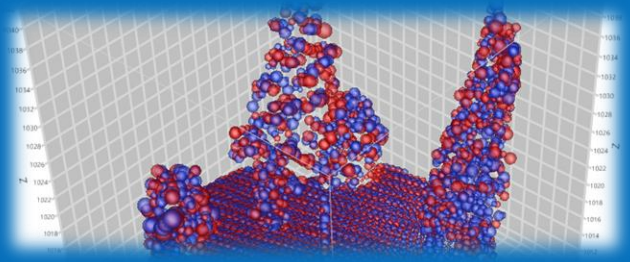
- Seamless 1m DEM
- New formats and data models
- Change detection to drive updates
- Inland bathymetry products

Transform from managing data to providing information



- Big 3D Data provisioning (HPC and cloud)
- 3DEP Ecosystem/data mesh
- New national tiling scheme

Engage and leverage the changing 3D industry



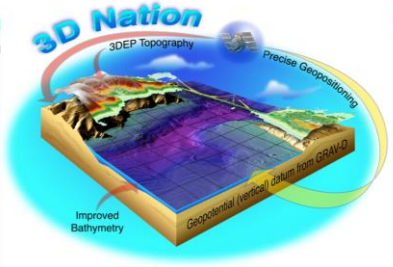
- Reporting uncertainty
- Full 3D accuracy testing
- New sensors
- Lidar-imagery integration

Next Generation 3DEP

Rolling out the new program

Requirements Study

Complete the 3D Nation Elevation Requirements and Benefits Study co-led with NOAA to guide the program design for next gen 3DEP



Publish 3D Nation Study report – *COMPLETE!*

National Program Recommendation

	3DEP Baseline		Next Gen 3DEP	
Target Quality Level For what QL of data will the USGS generally provide partner funding?	QL2 / QL5 in AK	★★☆	★★★	QL1 with partner option for QL2 in AK
Scope Where do we collect data?	Topographic data			Topographic and bathymetric data
Update frequency On what vintage of data does USGS partner to update coverage?	8 -10 years			4-5 years – assess after 5 years

Use results to determine program direction – *in progress/nearing completion*

3DEP Call for Action

Introduction of the 3D National Topography Model and Call for Action Part 2: Next Generation 3DEP

Vet 3DNTM Call for Action Part 2: Next Generation 3DEP with stakeholders – *late summer*

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National Landslides Preparedness Act (P.L. 116-323) Establishes the Federal Interagency Coordinating Committee

H.R. 8810

One Hundred Sixteenth Congress of the United States of America

AT THE SECOND SESSION

Begun and held at the City of Washington on Friday, the third day of January, two thousand and twenty

An Act

To establish a national program to identify and reduce losses from landslide hazards, to establish a national 3D Elevation Program, and for other purposes.

(b) 3D ELEVATION FEDERAL INTERAGENCY COORDINATING COMMITTEE.—

(1) ESTABLISHMENT.—The Secretary, in coordination with the Secretary of Commerce and the Secretary of Homeland Security, shall establish an interagency coordinating committee, to be known as the "3D Elevation Federal Interagency Coordinating Committee" (referred to in this subsection as the "Committee"), to better coordinate 3D elevation data management across the Federal Government.

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(2) MEMBERSHIP.—The Committee shall be composed of the following members (or their designees):

(A) The Secretary, who shall serve as Chairperson of the Committee.

(B) The Secretary of Agriculture.
(C) The Secretary of Commerce.
(D) The Secretary of Homeland Security.
(E) The Director of the National Science Foundation.
(F) The Director of the Office of Science and Technology Policy.
(G) The Director of the Office of Management and Budget.
(H) The head of any other Federal department or agency, at the request of the Secretary.

(3) COORDINATION.—The Committee shall coordinate, as appropriate, with the existing activities of—

(A) the 3D Elevation Program Executive Forum;
(B) the Alaska Mapping Executive Committee;
(C) the 3D Elevation Working Group;
(D) the 3D National Elevation Subcommittee; and
(E) State offices.

(4) MEETINGS.—The Committee shall meet at the call of the Chairperson.

(5) DUTIES.—The Committee shall—

(A) oversee the planning, management, and coordination of the 3D Elevation Program; and

(B) develop, by not later than 1 year after the date of enactment of this Act, and update periodically thereafter—

(i) a strategic plan that establishes goals and priorities for activities carried out under the 3D Elevation Program; and

(ii) a detailed management plan to implement the strategic plan.


THANK YOU!